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Edwards et al.

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(54) **HERB GRINDER**

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(73) Assignee: **SC Shredder IP, LLC**, Campbell, CA (US)

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(65) **Prior Publication Data**

US 2014/0217213 A1 Aug. 7, 2014

Related U.S. Application Data

(63) Continuation-in-part of application No. 13/433,060, filed on Jun. 11, 2012, now abandoned.

(51) **Int. Cl.**

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A47J 42/40	(2006.01)
A47J 42/38	(2006.01)
A47J 42/12	(2006.01)
A47J 42/14	(2006.01)

(52) **U.S. Cl.**

CPC ***A47J 42/40*** (2013.01); ***A47J 42/12*** (2013.01); ***A47J 42/14*** (2013.01); ***A47J 42/38*** (2013.01)

(58) **Field of Classification Search**

CPC A47J 42/00; A47J 42/12; A47J 42/14; A47J 42/20; A47J 42/32; A47J 42/34; A47J 42/38; A47J 42/40

USPC 241/168, 169, 169.1, 273.3; 131/105–110, 311–312

See application file for complete search history.

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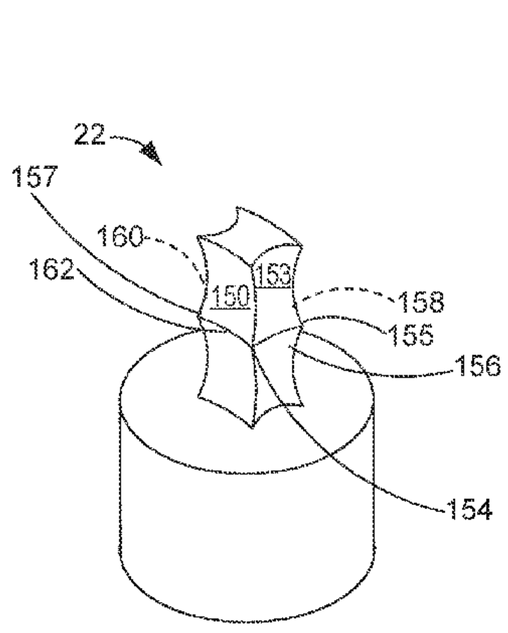
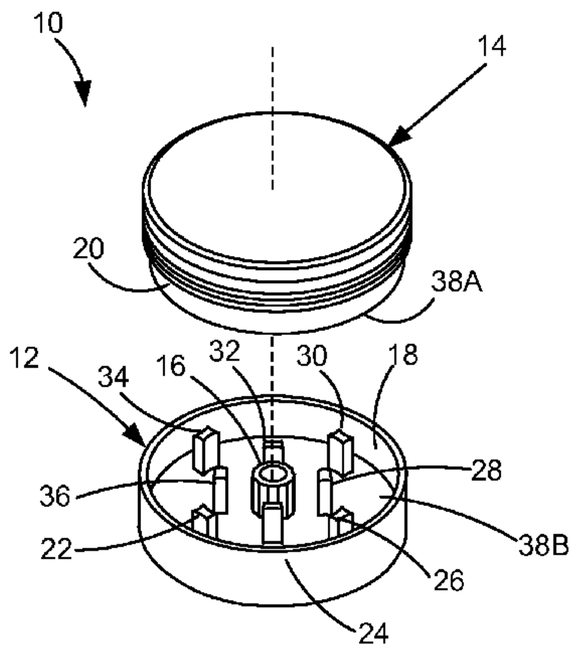
(57) **ABSTRACT**

A shredder or grinder for dried material such as herbs of dried leaves is a cylindrical container formed of a top element and a base element forming a chamber, the top element and the base element each having a series of concentrically arranged teeth on a base plate, wherein the teeth that slidably engage one another in a slicing motion to form grinding surfaces against one another, wherein the teeth are serrated to efficiently grind the dried materials in the chamber when the teeth engage one another and are counter rotated relative to one another. In one embodiment the chamber discharges the ground contents through orifices in the base element, where the size is regulated by a screen, and in another embodiment, the ground contents remain in the chamber until the grinding head is removed.

11 Claims, 11 Drawing Sheets





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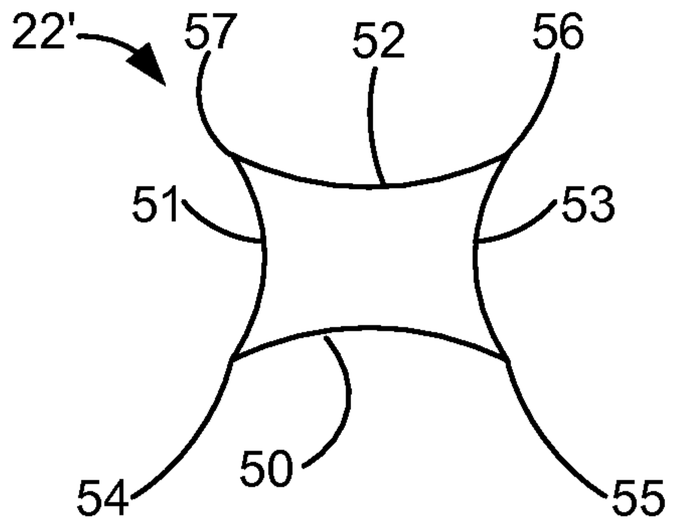

Fig. 1A

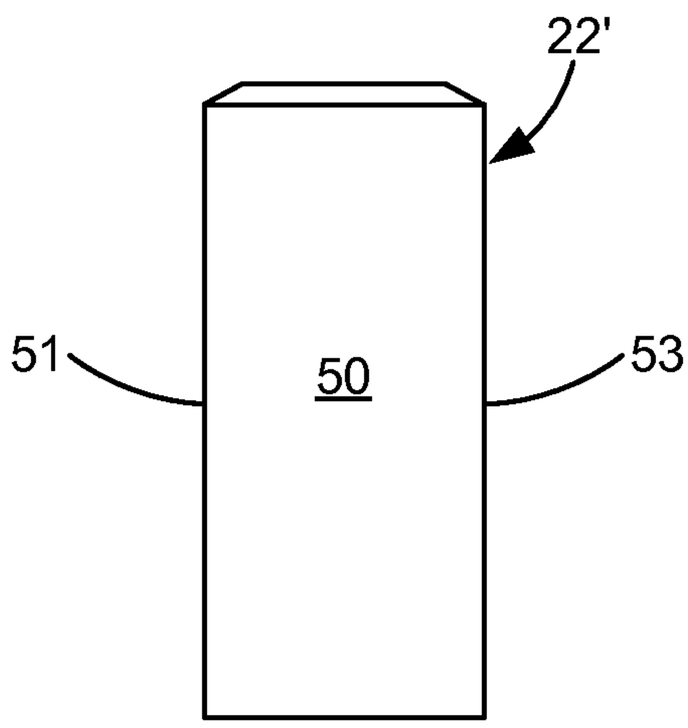

Fig. 1B

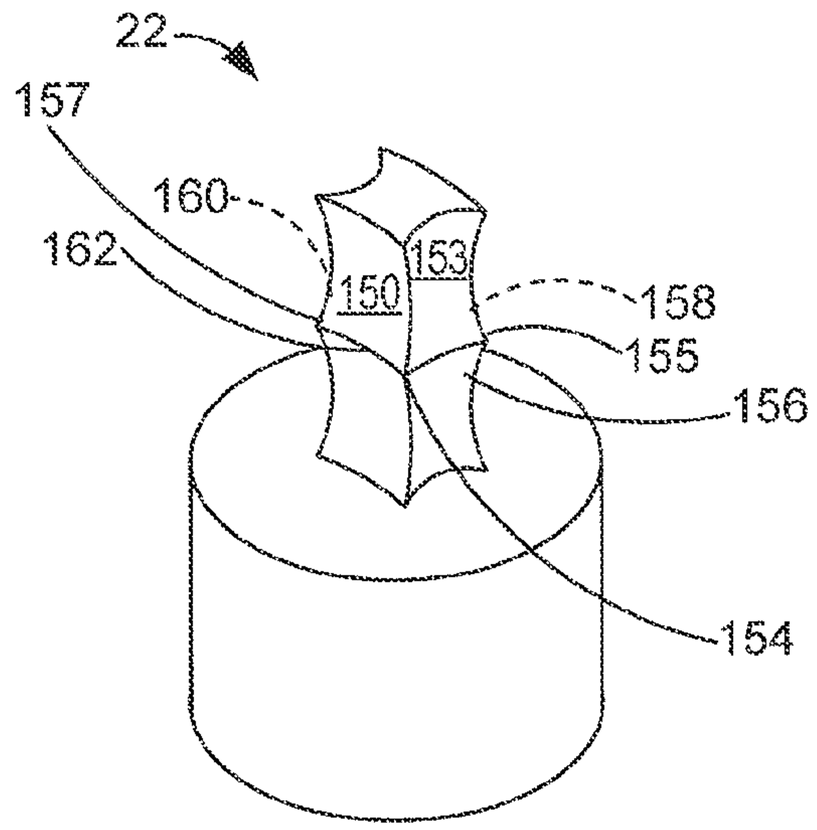

Fig. 1C

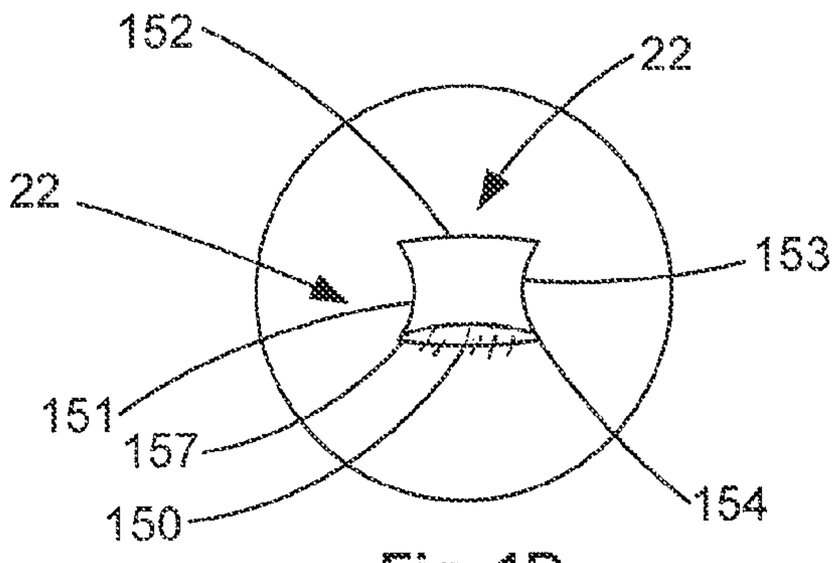

Fig. 1D

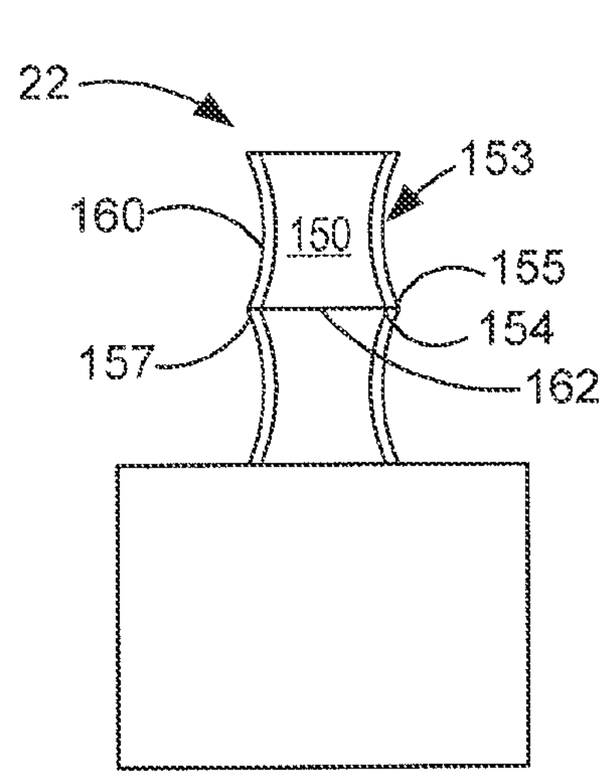

Fig. 1E

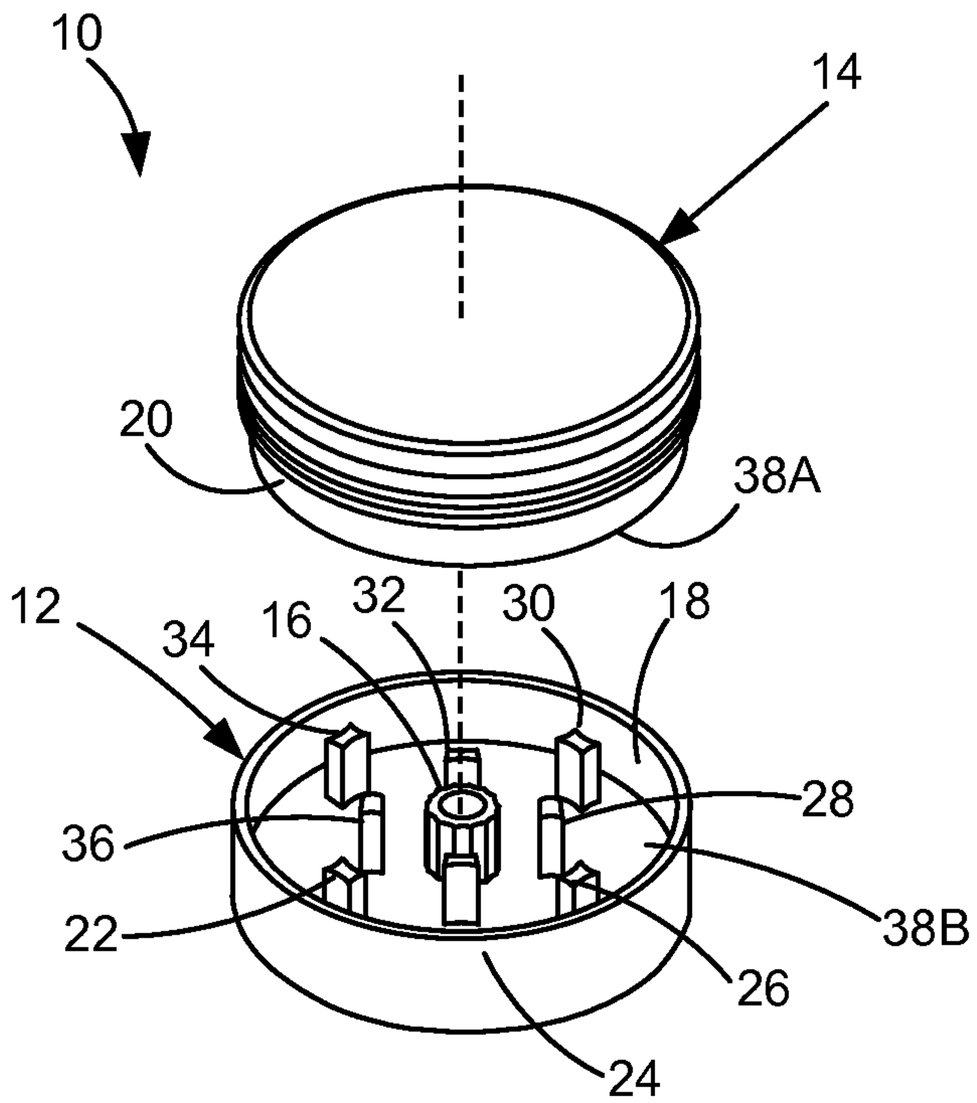

Fig. 2A

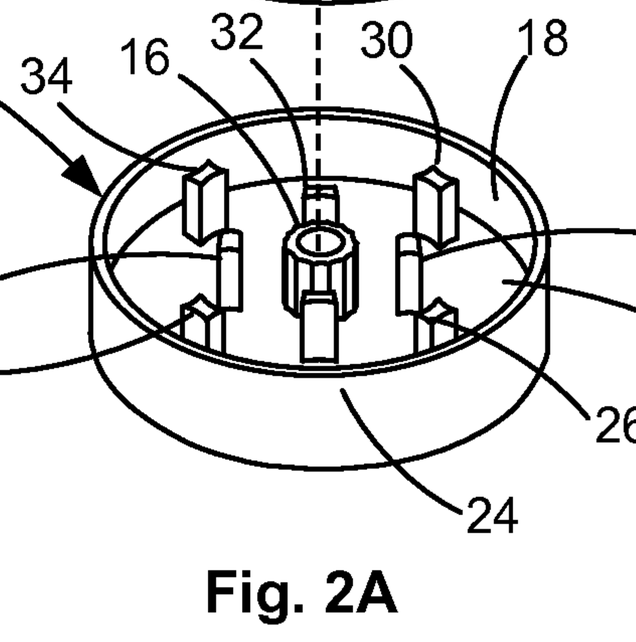

Fig. 2B

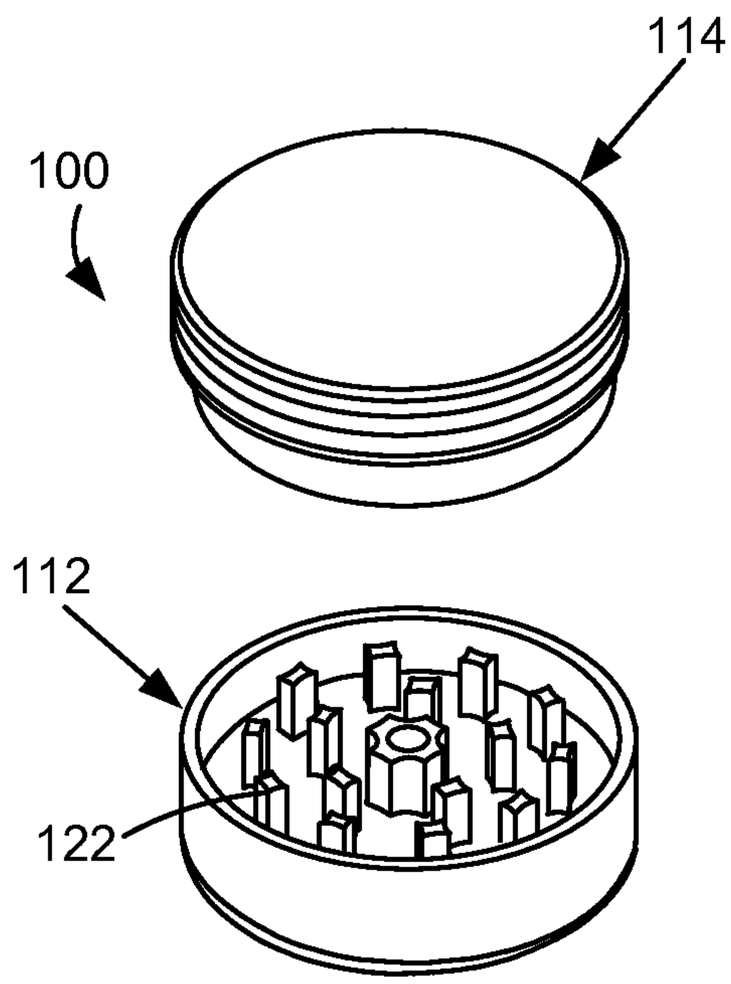

Fig. 3

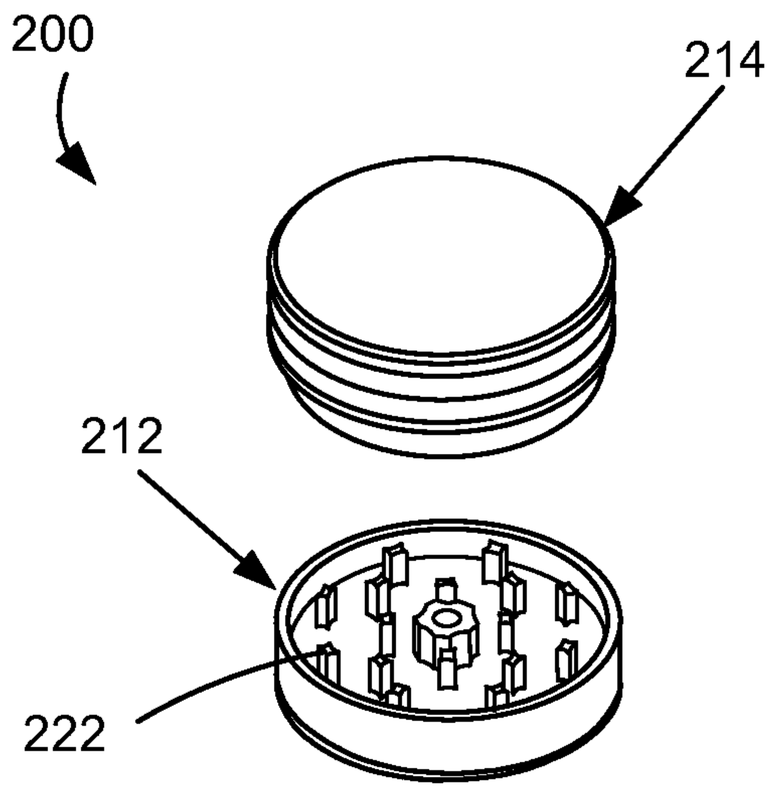

Fig. 4

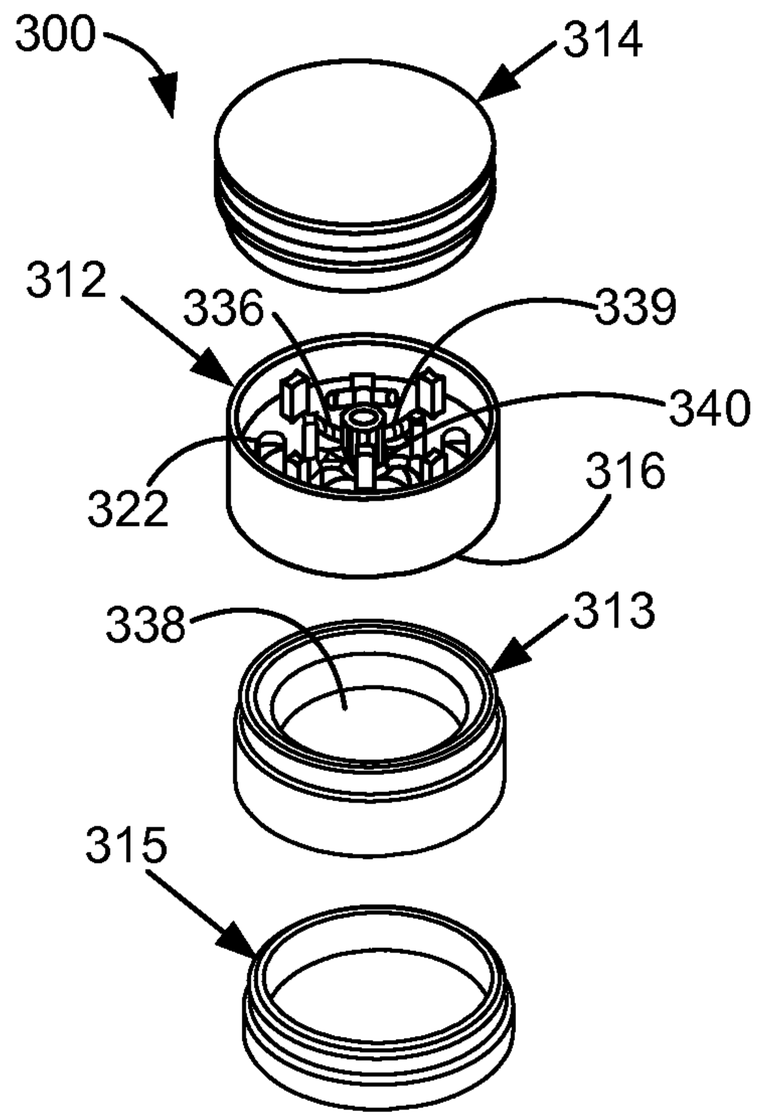

Fig. 5A

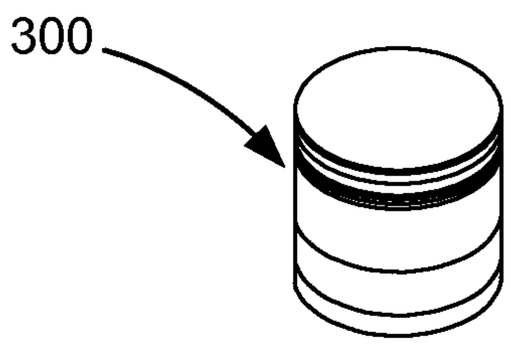

Fig. 5B

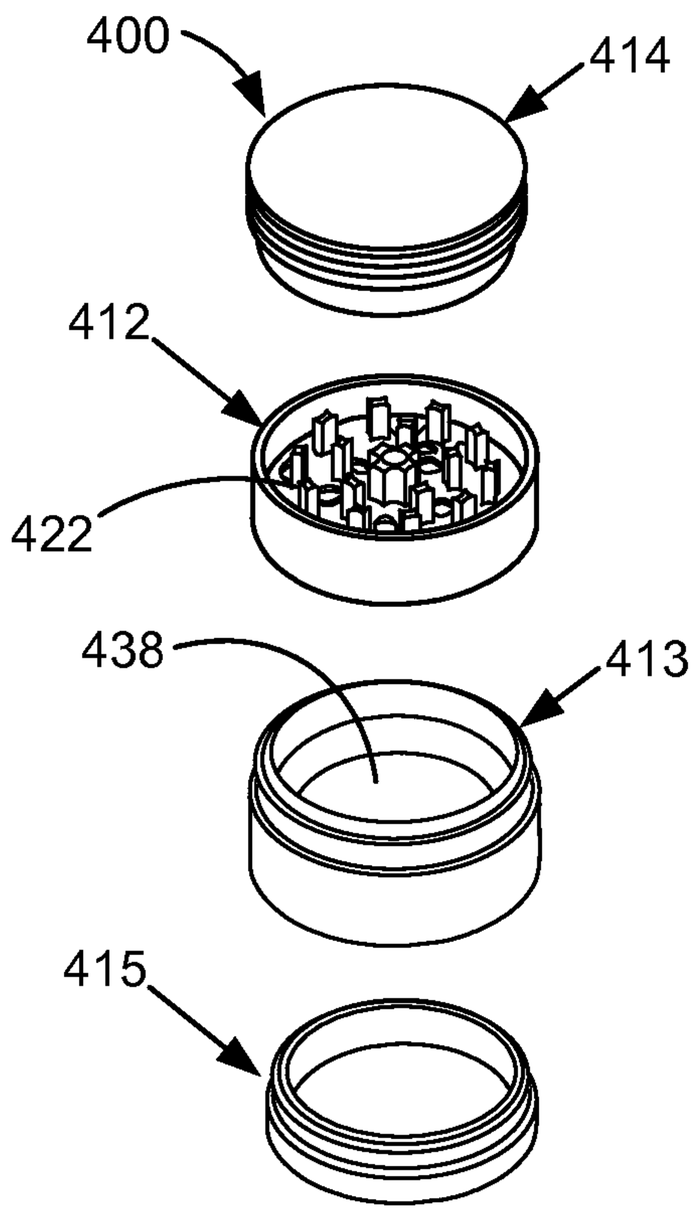

Fig. 6A

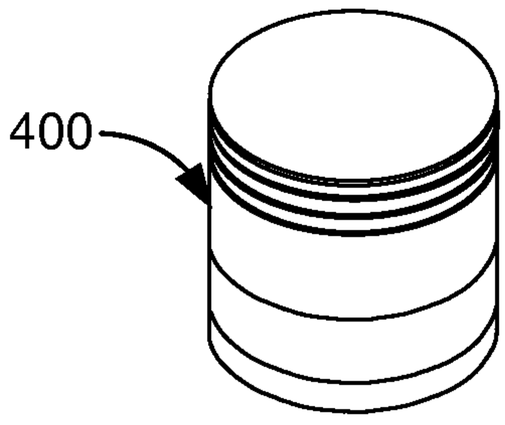

Fig. 6B

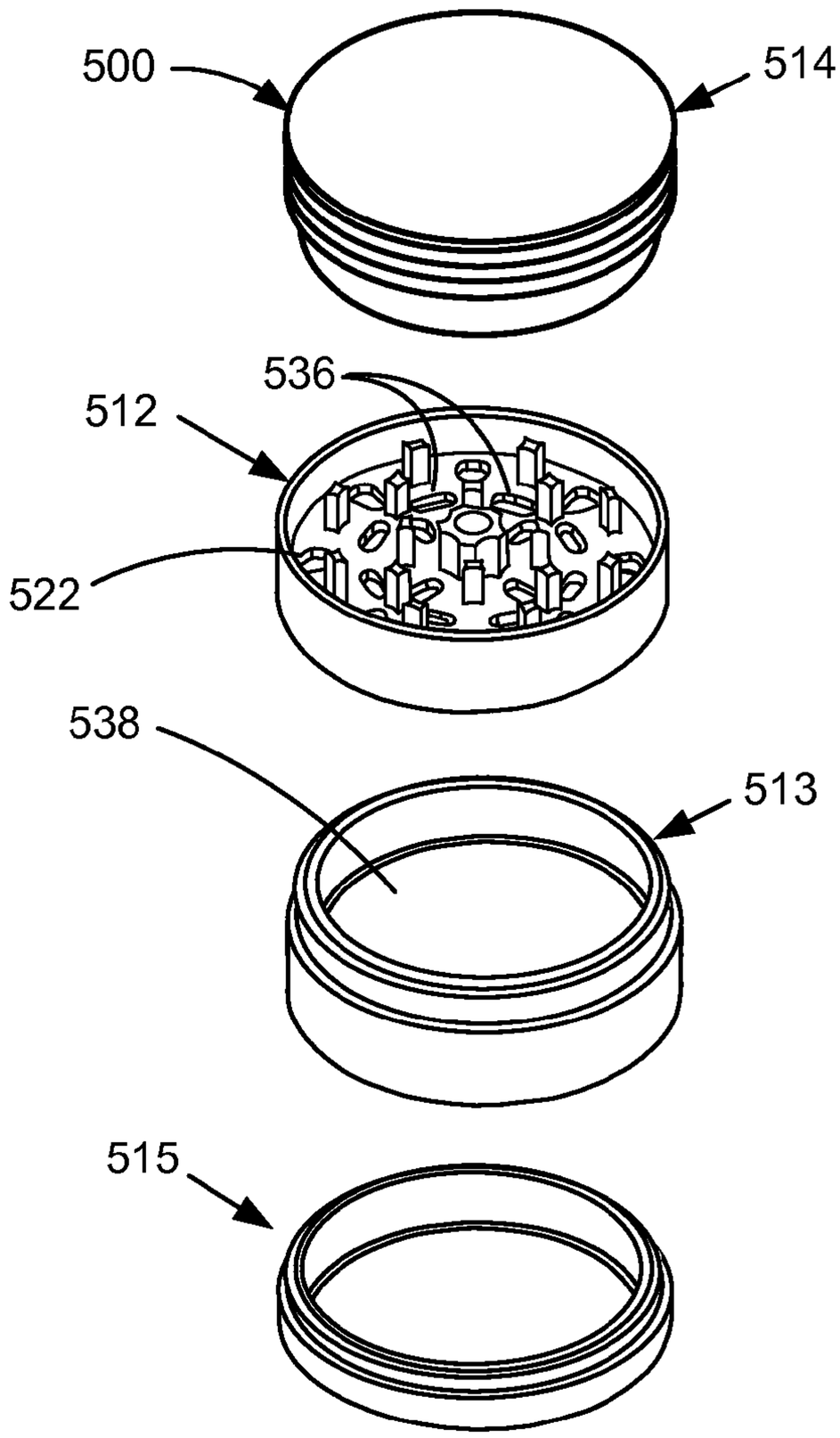

Fig. 7A

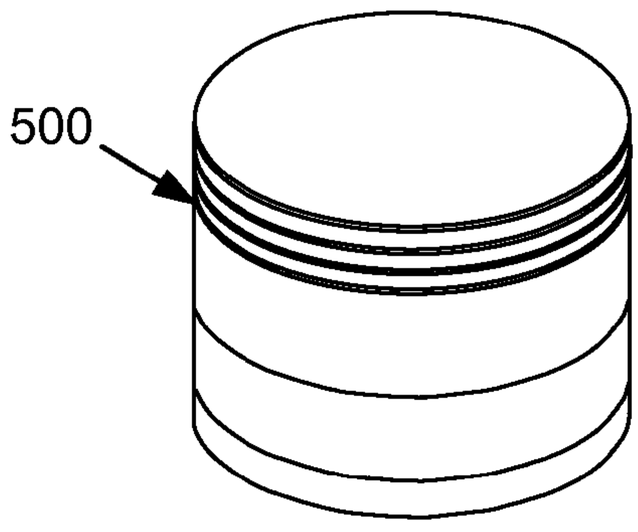

Fig. 7B

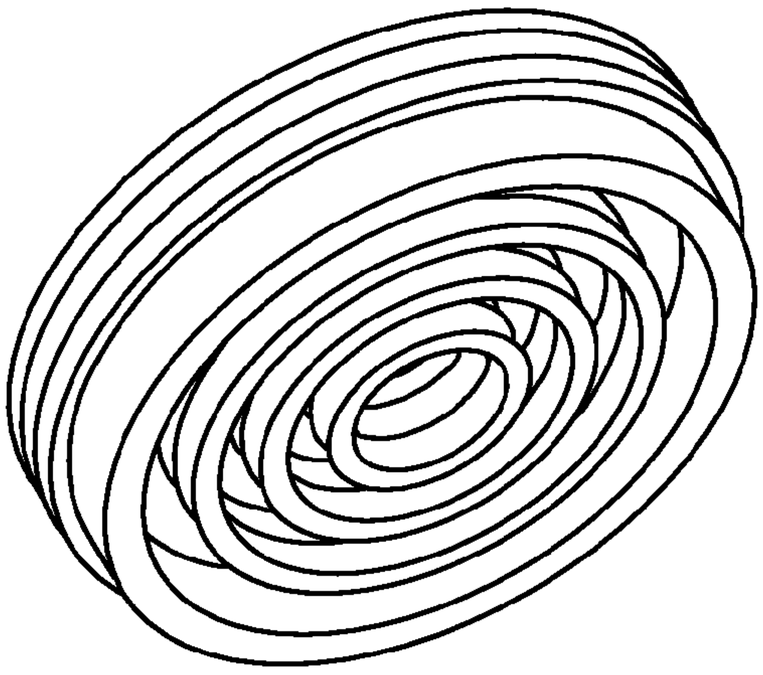

Fig. 8C

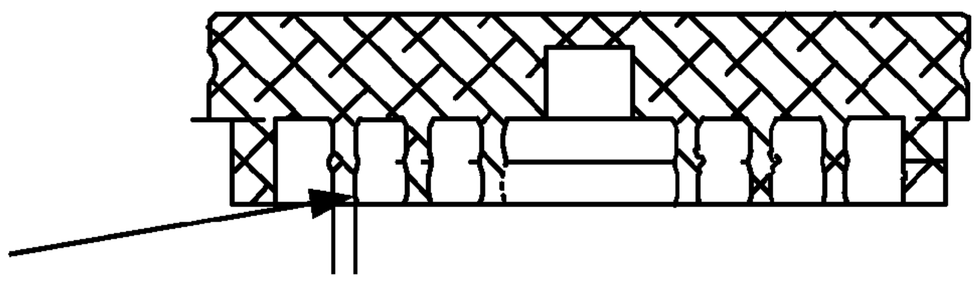

Fig. 8B

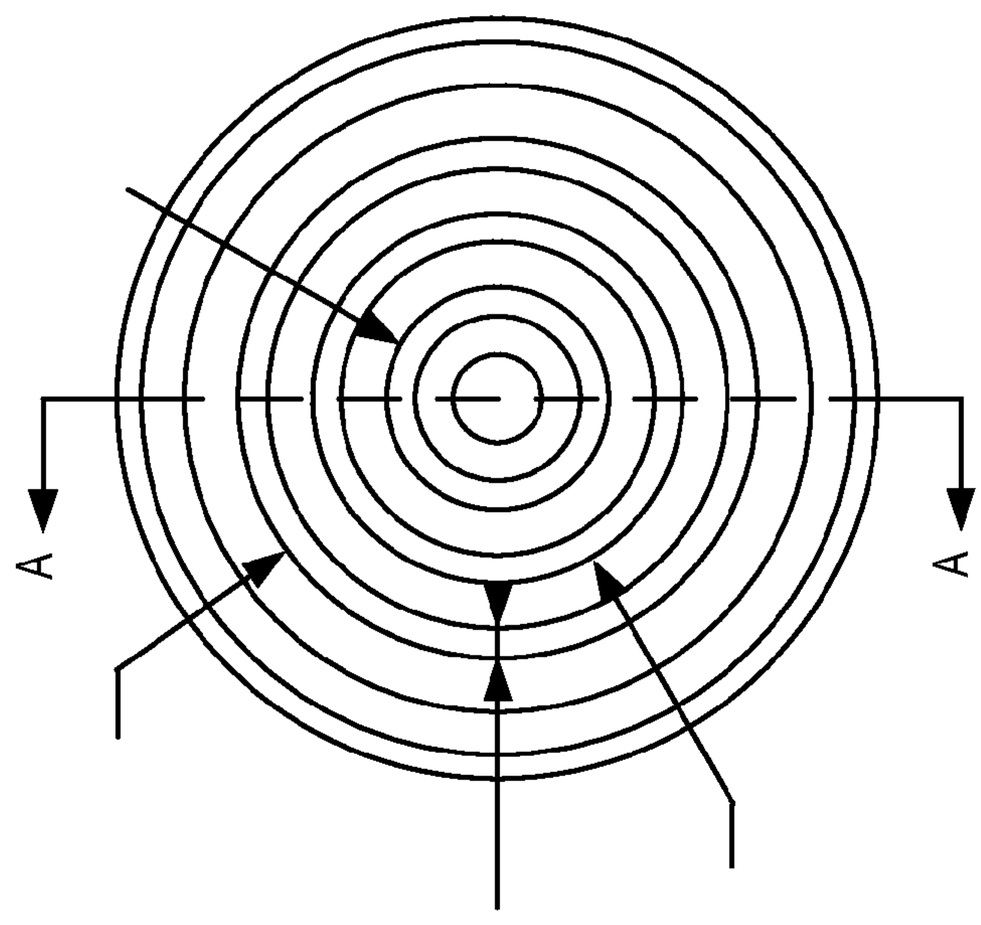

Fig. 8A

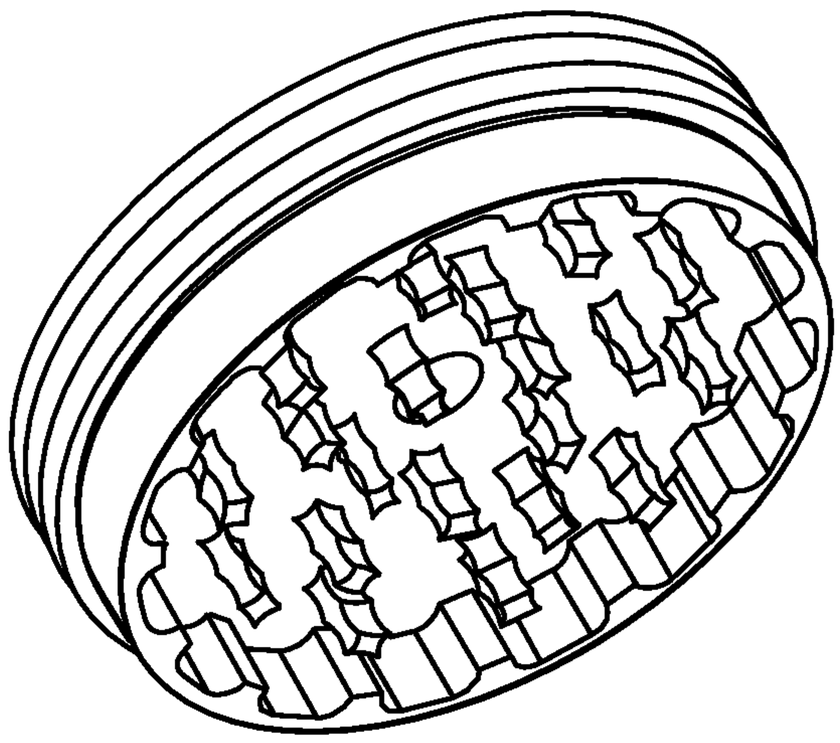

Fig. 8E

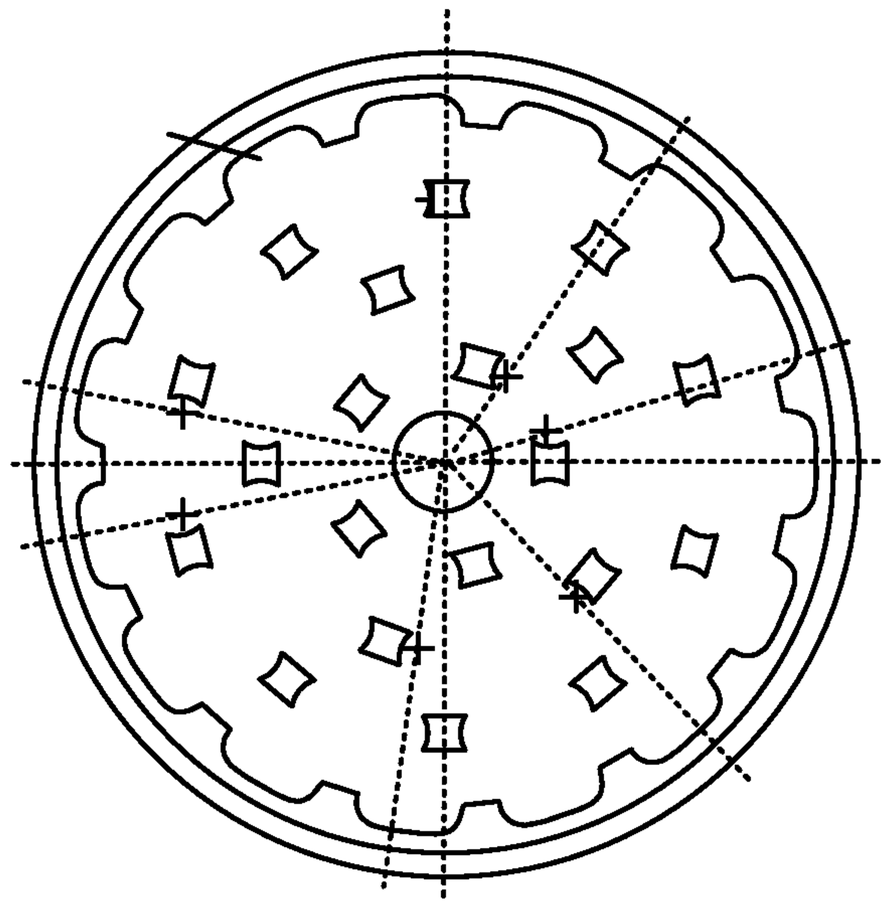

Fig. 8D

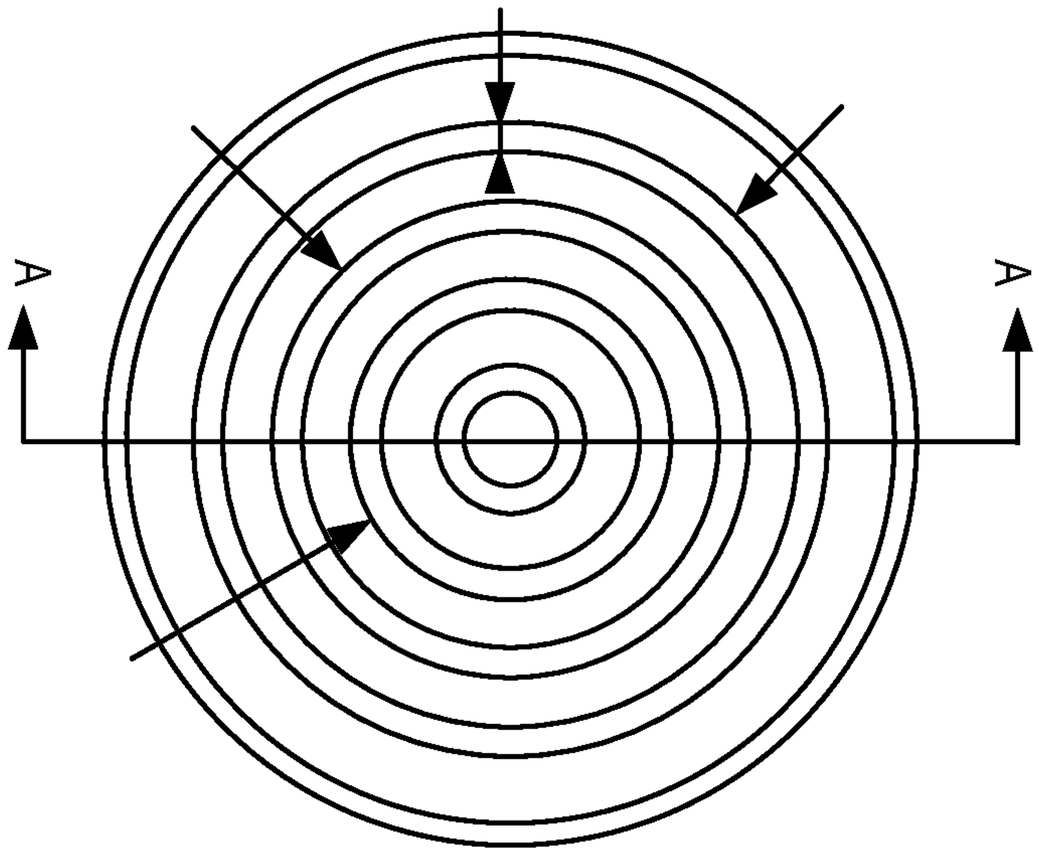

Fig. 9A

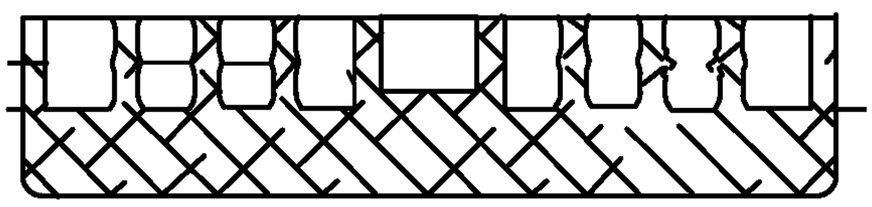

Fig. 9B

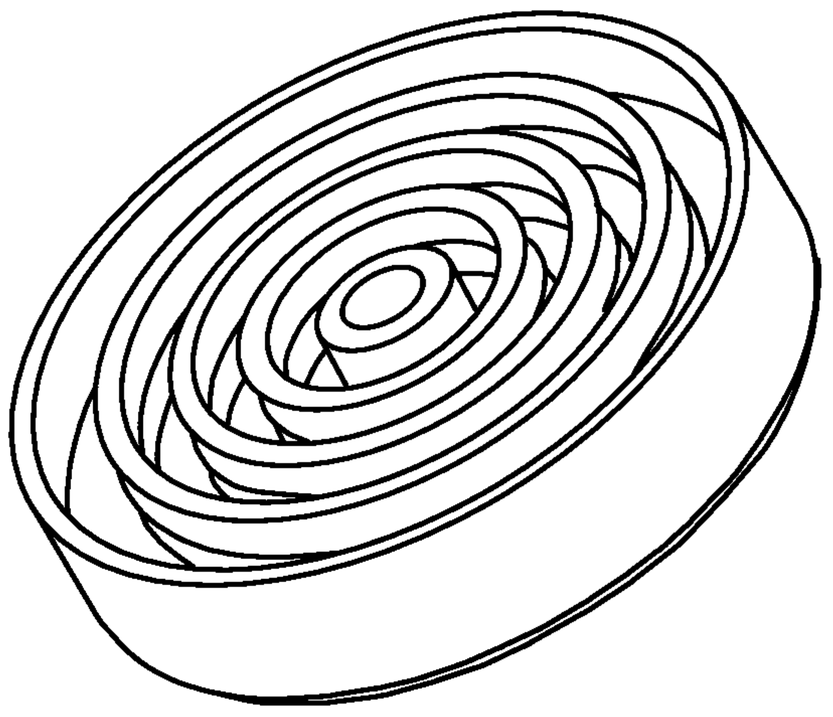

Fig. 9C

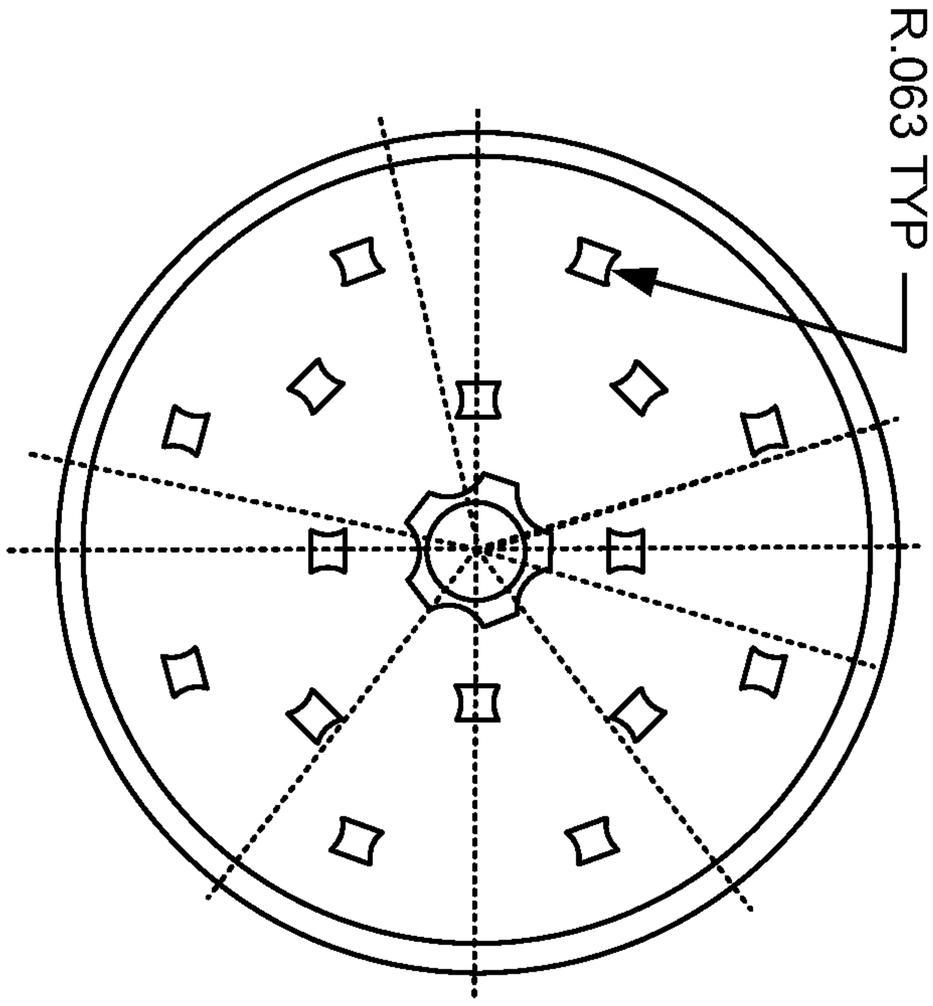

Fig. 9D

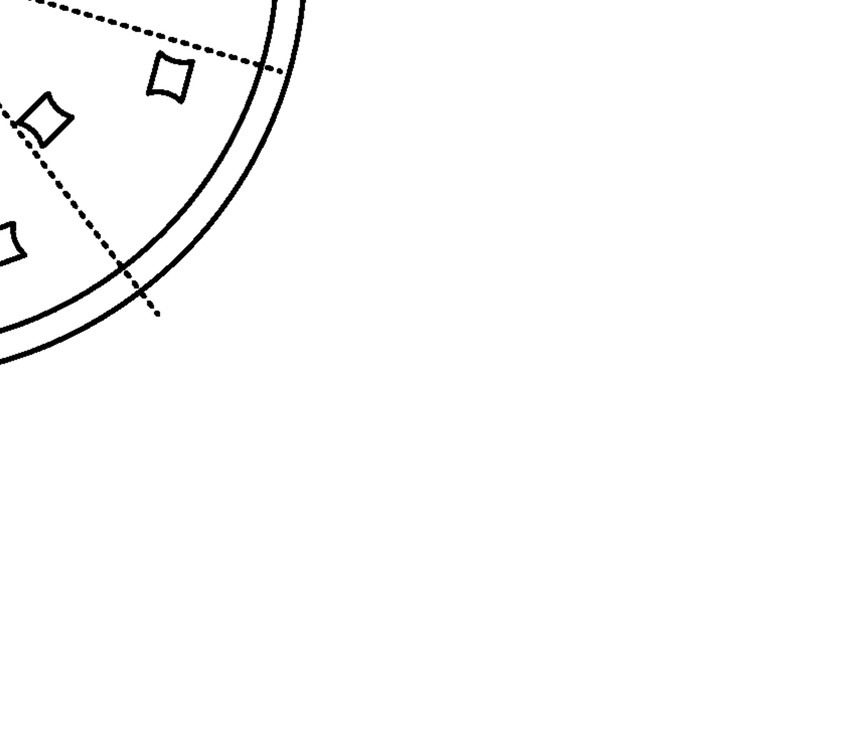

Fig. 9E

HERB GRINDER

CROSS-REFERENCES TO RELATED APPLICATIONS

This is a continuation-in-part of co-pending patent application Ser. No. 13/433,060 filed Jun. 11, 2012 in the name of Mark E. Edwards, the content of which is incorporated herein by reference in its entirety.

STATEMENT AS TO RIGHTS TO INVENTIONS MADE UNDER FEDERALLY SPONSORED RESEARCH AND DEVELOPMENT

Not Applicable

REFERENCE TO A "SEQUENCE LISTING," A TABLE, OR A COMPUTER PROGRAM LISTING APPENDIX SUBMITTED ON A COMPACT DISK

Not Applicable

BACKGROUND OF THE INVENTION

This invention relates to processing of herbs, in particular to the grinding of herbs and more particularly to the shredding of dried leaves, such as laurel and tobacco, into a powder.

Herbs are natural products with a variety of uses, including seasoning and medicinal applications. However, uses typically require some form of processing to render them useful. Food processors are well-known for preparing powders and slurries from nuts, stalks and the like. Grinders and shredders are known for processing dried leaves. Known devices for preparing leaves have in the past not always been capable of producing satisfactorily shredded or powdered end product.

What is needed is an improvement in the technology of leaf shredders or grinders for preparing dried leaves.

The following references were cited in the course of prosecution of the related patent parent application:

U.S. Pat. No. 8,393,563 dated March 2013 to Chaoui et al.;
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U.S. Pat. No. 7,367,519 B2 dated May 2008 to De Groote et al.;
U.S. Pat. No. 7,422,170 B2 dated September 2008 To Fan Bao; and
U.S. Pat. No. 7,886,999 B2 dated February 2011 to Ewhan Ruzycky.

BRIEF SUMMARY OF THE INVENTION

According to the invention, a shredder or grinder for dried material such as herbs of dried leaves comprises a cylindrical container comprising a top element and a base element forming a grinding chamber, the top element and the base element each having a series of concentrically arranged teeth on a base plate, wherein the teeth slidably engage one another in a slicing motion to provide grinding surfaces against one another, wherein the teeth are serrated to efficiently grind the dried materials in the chamber when the teeth engage one another and are counter rotated relative to one another. In one embodiment the chamber discharges the ground contents through orifices in the base element, where the size is regulated by a screen, and in another embodiment, the ground contents remain in the chamber until the grinding head is removed. This invention provides a portable, compact and efficient mechanism for producing a ground product from dried leaves.

The invention will be better understood by reference to the following detailed description in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1**A is a cross section of a first embodiment of a cutting tooth according to the invention.

FIG. **1**B is a side view of the first embodiment of a cutting tooth according to the invention.

FIG. **1**C is a perspective view of a second embodiment of a cutting tool on a section of a base according to the invention.

FIG. **1**D is a cross section of the second embodiment of a cutting tooth according to the invention.

FIG. **1**E is a side view of the second embodiment of a cutting tooth according to the invention.

FIG. **2**A is an exploded view of a first embodiment of the invention comprising a top and a base, in each of which cutting teeth of FIGS. **1**A-**1**E may be employed.

FIG. **2**B is a perspective view of the first embodiment of the invention wherein the two parts are engaged.

FIG. **3** is an exploded view of a second embodiment of the invention.

FIG. **4** is an exploded view of a third embodiment of the invention.

FIG. **5**A is an exploded view of a fourth embodiment of the invention comprising two sections in which cutting teeth of FIGS. **1**A-**1**E may be employed and a two-part reservoir.

FIG. **5**B is a perspective view of the fourth embodiment of the invention wherein the four parts are engaged.

FIG. **6**A is an exploded view of a fifth embodiment of the invention comprising two sections in which cutting teeth of FIGS. **1**A-**1**E may be employed and a two-part reservoir.

FIG. **6**B is a perspective view of the fifth embodiment of the invention wherein the four parts are engaged.

FIG. **7**A is an exploded view of a sixth embodiment of the invention comprising two sections in which cutting teeth of FIGS. **1**A-**1**E may be employed and a two-part reservoir.

FIG. **7**B is a perspective view of the sixthth embodiment of the invention wherein the four parts are engaged.

FIGS. **8**A-**8**E is a series of drawings illustrating the milling and lathe processes of a cutting head top of the type shown in the embodiment of FIG. **4**.

FIGS. **9**A-**9**E is a series of drawing illustrating the milling and lathe processes of a cutting head base of the type shown in the embodiment of FIG. **4**.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIG. **2**A and FIG. **2**B, there is shown a representative two-piece grinder **10** according to the invention comprising a base element **12** and a top element **14**. As herein explained, the top element **14** engages the base element **12** and is rotatable with respect to the base element **12** about a common axis defined by a center **16** and constrained by a rim **18** of the base element **12** in slidable contact with a circumferential flange **20** of the top element **14**. The top element **14** is a cylinder that is mated to the base element **12**. In accordance with the invention, a plurality of spaced-apart teeth **22**, **24**, **26**, **28**,**30**, **32**, **34**, **36** of a particular form factor are provided in the interior of the base element **12** in concentric rings and that engage other spaced-apart teeth (FIGS. **8**D and **8**E) also arranged in concentric rings disposed in concentric channels within the top element **14** so as to scrape against the

teeth in the opposing element when the top element **14** and the base element **12** are engaged and are rotated relative to one another. The chamber **38**A, **38**B formed by the mating of the top element **14** and the base element **12** is for receiving and grinding dried materials by the counter rotating motion of the top element **14** and base element **12**.

The number of rows of teeth vary with the size and design of the grinder **10**, although the design of the teeth may be common to all embodiments. FIG. **2**A is a representative small embodiment of a grinder **10** of a two-piece design with two concentric rows of teeth according to the invention.

FIG. **3** is a representative medium-sized embodiment of a grinder **100** of a two-piece design with two concentric rows in the base element **112** with a greater number of teeth **122** than in FIG. **2**A according to the invention. The top element **114** is appropriately configured to mate with the base element **112**.

FIG. **4** is a representative larger-sized embodiment of a grinder **200** of a two-piece design with three concentric rows in the base element **212** with a greater number of teeth **222** than in FIG. **2**A or FIG. **3** according to the invention. The top element **214** is appropriately configured to mate.

FIGS. **5**A and **5**B form a representative small-sized embodiment of a four-piece grinder **300** with two concentric rows of teeth **222** in the base element **312** and a mating top element **314**. In this embodiment, one or more orifices **336** are provided in the bottom **316** of the base element **312** to enable discharge of ground material without disassembling the top element **314** from the base element **312**. An optional magnet **340** is located in the base element **312** to capture any magnetic debris. A receiving chamber **338** is formed by ring **313** enclosed by base lid **315** and the bottom **316** of the base element **312**. The ring **313** is threaded at each end to engage the adjacent elements. The length of the ring **313** largely determines the capacity of the chamber **338**. A screen **339** in the bottom **316** may be provided with a mesh size to assure that ground particles are of no more than a design maximum size. (Optionally a second, finer-meshed screen may be provided at the bottom of the ring **313** to collect fine sized grounds in the base lid **315**.)

Similarly FIGS. **6**A and **6**B illustrate a representative medium-sized four-piece grinder **400**.

Similarly FIGS. **7**A and **7**B illustrate a representative large-sized four-piece grinder **400**. All of these embodiments are small enough to be held in the hand and operated manually.

Referring now to FIG. **1**A and FIG. **1**B, there is shown a detail of one embodiment of a tooth **22'** found in either the top element **14** or the base element **12**. The tooth **22'** of FIG. **1**A comprises a straight cylinder with generally parallel faces **50**, **52** and **51**, **53**, wherein on at least two adjacent sides **50**, **51** there is formed a concave longituinal profile to their edges so as to define an enhanced blade edge **54**. The blade edges **54-57** constitute the cutting component working with complementary blade edges of the opposing element.

In a more preferred embodiment, the blade is serrated. Referring now to FIG. **1**C, FIG. **1**D and FIG. **1**E, there is shown a detail of a second embodiment of a tooth **22** found in either the top element **14** or the base element **12**. The tooth **22** of FIG. **1**C comprises a straight cylinder with generally parallel faces **150**, **152** and **151**, **153**, wherein on at least two adjacent sides **150**, **151** there is formed a concave longituinal profile to their edges and perpendicular serrations **156**, **158**, **160**, **162** across the faces **150-153** the so as to define at least one enhanced serrated blade edge **154**. The blade edges **154-157** constitute the cutting surface with complementary blade edges of the opposing element. One of the faces **152**, namely the face that confronts the outer edge of the element may have a convex longitidinal profile whose curvature matches the curvature of the circumference at the established radius of the element. Similarly the face **150** facing the center of the element may have a concave curvature that matches the curvature of the circumference of the element at that established radius of the element. This design feature follows from the manufacturing process as hereinafter explained. In addition the teeth may be of differing lengths.

FIGS. **8**A through **8**E illustrate an exemplary top element **14** at various stages of manufacturing. The process involves cutting metal stock into concentric rings on a face in the cylindrical base stock with a lathe tool having a head that shapes the inner and outer surfaces of the rings with at least a pair of concave channels (FIG. **8**B). The result is a piece having a plurality of concentric rings protruding from the cylindrical base stock (FIG. **8**C). Thereafter a milling operation cuts the rings with a head having a multilevel convex face to carve out concave features that form from the ring material the intended serrated teeth (FIG. **8**D and FIG. **8**E). A similar process is used to carve out serrated teeth in the base element stock material (FIGS. **9**A-**9**E), wherein the teeth in the base element **12** are disposed to be intersticed with the teeth of the top element **14** to track in noninterfering paths with slicing motion when the top element and base element are counter-rotated. The placement of the multiple cutting teeth in the grinder is intended to promote optimal grind efficiency.

The invention has been explained with reference to specific embodiments. Other embodiments will be apparent to those of ordinary skill in the art. Therefore it is not intended that the invention be limited, except as indicated by the appended claims.

What is claimed is:

1. A device comprising:

a first cylindrical element having a first cylindrical wall surrounding a circular a base disk, the base disk having a first set of protruding teeth disposed in a plurality of first concentric rings on a first side of the base disk, the first cylindrical element defining in a first chamber for receiving dried materials to be ground;

a second cylindrical element having a top disk, the top disk having a second set of protruding teeth disposed in a plurality of second concentric rings on a first side of the top disc, the second cylindrical element being configured to fit into in the first chamber such that the second set of protruding teeth slidably engage with the first set of protruding teeth, the first set of protruding teeth and the second set of protruding teeth each having serrations along their longitudinal dimension, confronting faces of opposing first set of of protruding teeth and second set of protruding teeth being configured to in order to produce a ground output when the first cylindrical element is rotated relative to the second cylindrical element around an axis common to the base disk and the top disk.

2. The device of claim **1** further comprising orifices in the base disk for discharging grounds from the first chambers.

3. The device of claim **2** further comprising a screen between the first chamber and the orifices and having a mesh size sufficiently small to pass only desired sizes of the ground output from the first chamber.

4. The device according to claim **3** further including a second chamber for collecting the ground output from the first chamber.

5. The device according to claim **4** wherein the first and second sets of protruding teeth each comprise four faces having concave surfaces along their longitudinal dimension, at least one of the concave faces having lateral protrusions extending laterally across each of the teeth to form the serrations.

6. The device according to claim 5 wherein the serrations are formed on all sides of each of the teeth.

7. The device according to claim 1 wherein each of the protruding teeth comprise four faces, at least one of the four faces having a concave surface along its longitudinal dimension, said at least one of the concave faces having a protrusion extending laterally across to form the serrations.

8. The device according to claim 7 wherein the serrations are formed on all sides of all teeth of the first and second sets of the protruding teeth.

9. The device of claim 7 wherein the face of the teeth of the first disk and of the second disk that is facing toward the center of the disk element has a concave lateral curvature that matches the curvature of the circumference of the element at that established radius of the element.

10. The device of claim 9 wherein the face of the teeth of the first disk and of the second disk that is facing away from the center of the disk element has a convex lateral curvature that matches the curvature of the circumference of the element at that established radius of the element.

11. The device of claim 1 wherein selected ones of the teeth of the first disk and of the second disk are of differing lengths.

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